"Detection of HPV 16 and 32 from HIV+ Individuals "

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Stanley S. Scott Cancer Center – Short Research Experiences in Cancer

McQuirter poster presentation

Human papillomavirus (HPV) infection is linked to most if not all cervical cancer and anal cancer. HPV is also the cause of approximately 33% of head and neck cancers and up to 50% of tonsillar cancers. HPV-16 has been linked to about 60% of all HPV-related cervical cancers, 80% of anal cancers and over 90% of HPV-related oral cancers. Research is ongoing to look at HPV infections in the oral cavity. In particular, HPV-16 is linked to oral cancers which are increased in the HIV+ population (2-4 fold). In addition, HPV-32, which has been associated with the presence of oral warts, has increased by 3 fold in the HIV+ population. Data from the Hagensee laboratory has shown that over 50% of the oral warts contain HPV-32 in them. In the HIV+ population there is no decrease in these despite HAART (Highly active anti-retroviral therapy). It's unclear why the HIV+ population on HAART continue to have steady rates of HPV-16 & HPV-32 infections. The goal of this study was to examine the rates of HPV-16 and 32 in HIV+ individuals over the past 10+ years.

Hypothesis

Rate of HPV 16 and HPV 32 in oral cavity of HIV+ individuals will remain the same over time with the advent of HAART (Highly active anti-retroviral therapy).

Methodology

Study #1 – cross sectional study of over 400 individual HIV+ patients from 2002-2005 examining the rates of oral HPV infection

Six samples were collected from recruited subjects from the mouth including: lips, gums, tongue, tonsil, cheek, under the tongue. A saliva and gargle sample was also obtained. These samples were tested for HPV-16 by the Reverse Line Blot PCR Assay and for HPV-32 by line blot, dot blot and PCR assays. All sites were combined in this analysis.

Study #2 – 1st visit of longitudinal study of HIV+ patients from 2008-2009 (18 month study at 3 month intervals) examining the duration of oral HPV infection

Six samples were collected from recruited subjects from the mouth including: lips, gums, tongue, tonsil, cheek, under the tongue. A saliva and gargle sample was also obtained. These samples were tested for HPV-16 and HPV-32 by a type specific PCR assays. All sites were combined in this analysis.

Study #3 – 1st visit of study from 2013-2014 examining the oral microbiome and its relationship to oral HPV infection

A gargle sample was collected from recruited subjects. DNA extraction was performed using the Qiagen DNA blood mini kit. HPV-16 and HPV-32 was detected using a type specific PCR assay.

Statistical analysis was performed using SPSS version 22.

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Demographics

Demographics	Frequency	Percent	Mean
Age			**42**
1-30	46	9.2%	
31-40	156	31.1%	
41-50	197	39.2%	
51>	96	19.1%	
Total	**495**		
Race			
White	149	29.7%	
Black	340	67.7%	
Hispanic	2	0.4%	
Asian	1	0.2%	
Indian	7	1.4%	
Other	2	0.40%	
Total	**501**		
Gender			
Female	164	32.7%	
Male	333	66.3%	
Total	**497**		
CD4 Count			**437**
1-200	137	27.3%	
201-500	170	33.9%	
>500	154	30.7%	
Total	**461**		
Viral Load			**77,576**
1-1,000	212	42.2%	
1,001-100,000	167	33.3%	
>100,001	71	14.1%	
Total	**450**		
HPV Positive			
HPV-16	14/364	3%	
HPV-32	39/499	8%	

Conclusions

- Subjects with a CD4 T-cell count between 201-500 cells/mm^3 had an increased rate of HPV -16 and/or HPV-32 positive infections than those with counts <200 or >501 but this was not statistically significant.
- Subjects that were between the ages of 41-50 had an increased rate of positive HPV -16 and/or HPV-32 infections than those who were ages 1-30, 31-41,and/or >50 but this was not statistically significant.
- Subjects who were male had an increased rate of positive HPV -16 and/or HPV-32 infections than females but this was not statistically significant.
- African Americans had an increased rate of positive HPV -16 and/or HPV-32 infections when compared to Whites yet this was not statistically significant.
- Subjects with a 1-1,000 copies/ml HIV viral load had an increased rate of HPV -16 and/or HPV-32 infections than those with a viral load of 1,001-100,000 and/or >100,001 but this was not statistically significant.
- Subjects between year 2008-2009 had an increased rate of HPV -16 infections compared to those between the years of 2002-2005 and 2013-2014. Overall, a strong statistical difference in the HPV-16 rates by year (p=.000) with specific significant decreases seen between 2002 and 2003-5 (p=.048) as well as between 2008-9 and 2013-14 (p=.011). This may be partially explained by an increase in age of the 2013-14 study participants.
- **FUTURE DIRECTIONS –** plan to implement strategies to analyze the role of HAART (Highly active anti-retroviral therapy) in the rates of oral HPV-16 and 32 in these patients.

Results

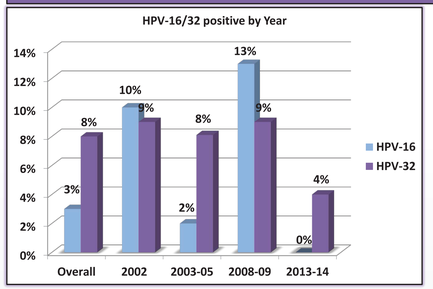

Fig. 1 Subjects positive for HPV-16 and/or HPV-32 stratified by year. Overall there was a strong statistical difference in the HPV-16 rates by year (p=.000) with specific significant decreases seen between 2002 and 2003-5 (p=.048) as well as between 2008-9 and 2013-14 (p=.011)

Year	CD4	VL	Age
2002	367	105,284	44.3
2003	451	84,126	39.9
2004-5	417	64733	42.2
2008-9	422	57683	43.2
2013	506	62316	51.8

Table 1: The reasons for the drop in HPV-16 oral infection rate is not clear. Further evaluation noted a trend for increase in CD4 cell counts (p=0.13) and the age was significantly increased (p=0.000) in the 2013 group as compared to the 2008-9 group.

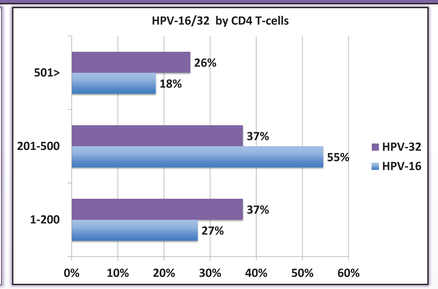

Fig. 2 Subjects positive for HPV-16 and/or HPV-32 stratified by their CD4 T-cell count.

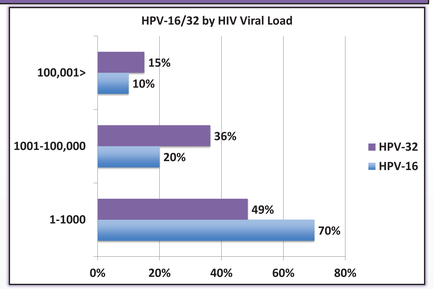

Fig. 3Subjects positive for HPV-16 and/or HPV-32 stratified by their HIV viral load.

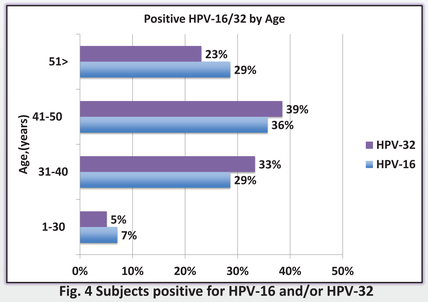

Fig. 4 Subjects positive for HPV-16 and/or HPV-32 stratified by their age.

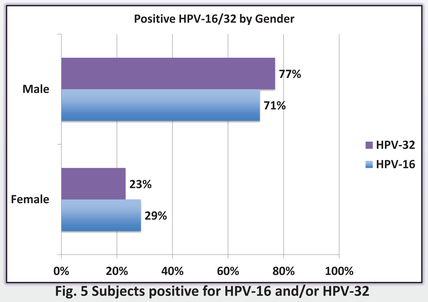

Fig. 5 Subjects positive for HPV-16 and/or HPV-32 stratified by their gender.

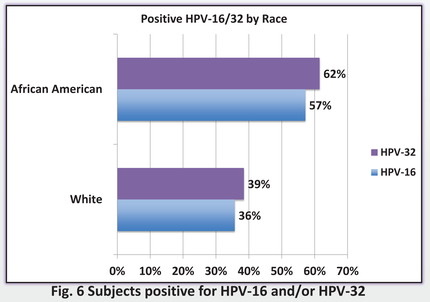

Fig. 6 Subjects positive for HPV-16 and/or HPV-32 stratified by their race.